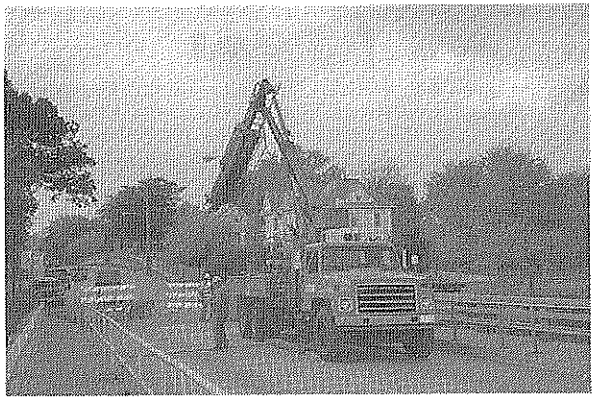
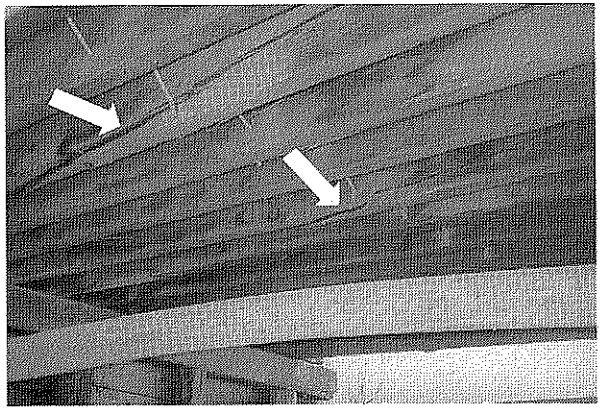
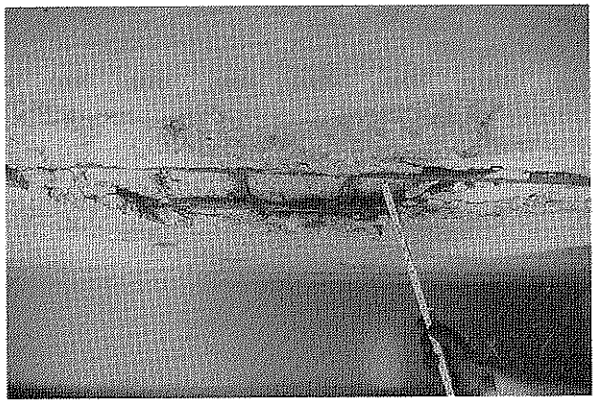
Results of overstressed bridges.



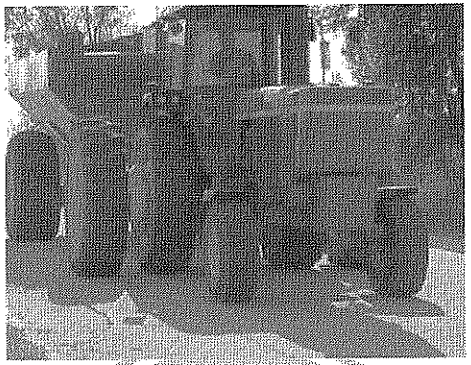
Temporary closure to traffic.



Cracked timber stringers.



Concrete slab spalling.



Some facts about bridges in Iowa

Number of bridges on county roads 20,387

Number of embargoed bridges on county roads 6,933

Number of bridges in the state (total) 25,188

For more information contact:
Iowa Department of Transportation
Office of Bridges and Structures
800 Lincoln Way
Ames, IA 50010
515-239-1564

Protecting our bridges for the future

Iowa Department of Transportation

October 1998

Protecting our bridges for the future

Changes in agricultural operations over the past 30 years are having a dramatic impact on Iowa's roads and bridges. The average size of an Iowa farm has increased to 339 acres today, nearly 70 percent greater than in 1970. Modern agricultural practices have also produced higher yields per acre, which means more grain to haul to market.

In order to increase efficiency, farmers are beginning to use larger capacity wagons hauling more bushels per trip to the elevator, and using much heavier equipment in their farming operations. **This trend is stressing Iowa bridges beyond the current capabilities to maintain them.**

Bridges are subject to damage from a combination of the weight on each axle and the spacing of those axles. Iowa laws set maximum gross axle weights of 20,000 pounds for a single axle and 34,000 pounds for a tandem axle.

Most vehicles used as "implements of husbandry" are exempt from the weight limits. **Consequently, many vehicles used in farming operations exceed the weight limits applied to other vehicles.**

Many bridges in Iowa are over 50 years old. These bridges were designed for lower traffic volumes, smaller vehicles and lighter loads than are common today. Over 30 percent of Iowa's county bridges are classified as deficient and need to be rehabilitated or replaced. **Many of these bridges are deficient because their load carrying capacity is inadequate for today's traffic.**

The weight carried on tractor-semitrailers is distributed over more axles and a greater length to limit the stress on bridges to acceptable levels. The design of some farm equipment, such as combines and tractors, also results in acceptable stress levels. The vehicles which carry heavy loads on a limited number of axles (one- and two-axle grain carts, grain wagons and liquid manure tanks) are creating significantly more stress on bridges.

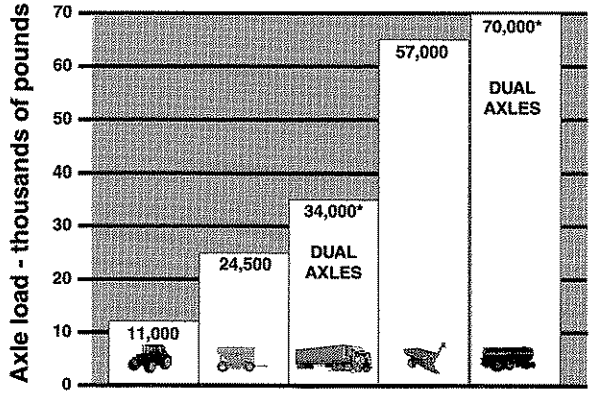
These farm implements are traveling on Iowa's roadways with loads that are well over the maximum axle weights that are permitted for large commercial vehicles. This stress, compounded by the fact that most " implements of husbandry" are exempt from bridge embargoes, may have serious safety implications.

Axle weight comparisons

	**Large row crop tractor** **18,000 lbs.**	**2 single axles** **11,000 lbs. front/7,000 lbs. rear**
	**Grain wagon - 775 bu.** **49,000 lbs.**	**2 single axles** **24,500 lbs. each axle**
	**5-axle truck** **80,000 lbs.**	**2 dual axles/1 single axle** **34,000 lbs. duals/12,000 lbs. single**
	**Grain cart - 875 bu.** **68,700 lbs.**	**1 single axle** **57,000 lbs.**
	**Liquid manure tank** **10,000 gal.** **96,000 lbs.**	**2 dual axles** **70,000 lbs. rear duals** **26,000 lbs. front duals**

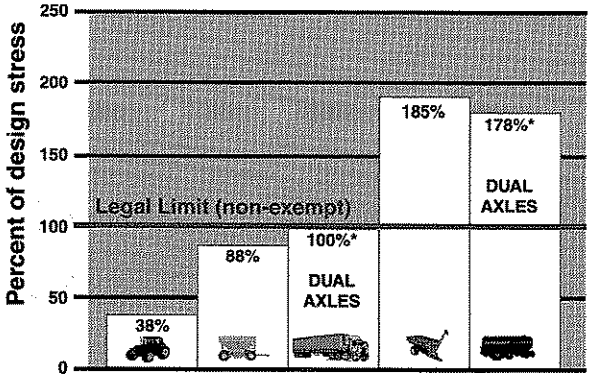
Subjecting bridges to vehicles that are heavier than the bridges were designed to carry shortens the service life, and can cause both visible and hidden damage. **The cumulative effect of the damage caused by these heavy loads will eventually force the roadway jurisdiction owning the bridge to restrict the weight of vehicles using the bridge or, in extreme cases, to close the bridge to all traffic.**

Axle loads



* Axle load for dual axles

Stress - standard 20-foot single span bridge



* Stress from dual axles